

4.7(6.1) - Solving Quadratic Equations

Recall:

To solve an equation, find value(s) that satisfy the equation (i.e., make it true).

This value is called the solution or root of the equation.

Ex.1 Solve  $x^2 - 12x + 32 = 0$

*find roots*

$$x^2 - 8x - 4x + 32 = 0$$

$$x(x-8) - 4(x-8) = 0$$

$$(x-4)(x-8) = 0$$

$$x-4=0 \quad \text{or} \quad x-8=0$$

$$x=4 \quad \text{or} \quad x=8$$

We have most often solved for the zeroes of the quadratic equation, but we can solve for any value.

Ex.2 Solve  $y = 2x^2 + 5x - 12$  for

(a)  $y = 0$

$$0 = 2x^2 + 5x - 12$$

$$+8x - 3 = -24$$

$$\underline{8} + \underline{-3} = 5$$

$$= 2x^2 + 8x - 3x - 12$$

$$= 2x(x+4) - 3(x+4)$$

$$= (2x-3)(x+4)$$

$$2x-3=0 \quad \text{or} \quad x+4=0$$

$$\frac{2x}{2} = \frac{3}{2} \quad x = -4$$

$$x = 1.5$$

(b)  $y = -12$

*finding matching point*

$$-12 = 2x^2 + 5x - 12$$

$$-12 + 12 = 2x^2 + 5x$$

$$0 = 2x^2 + 5x$$

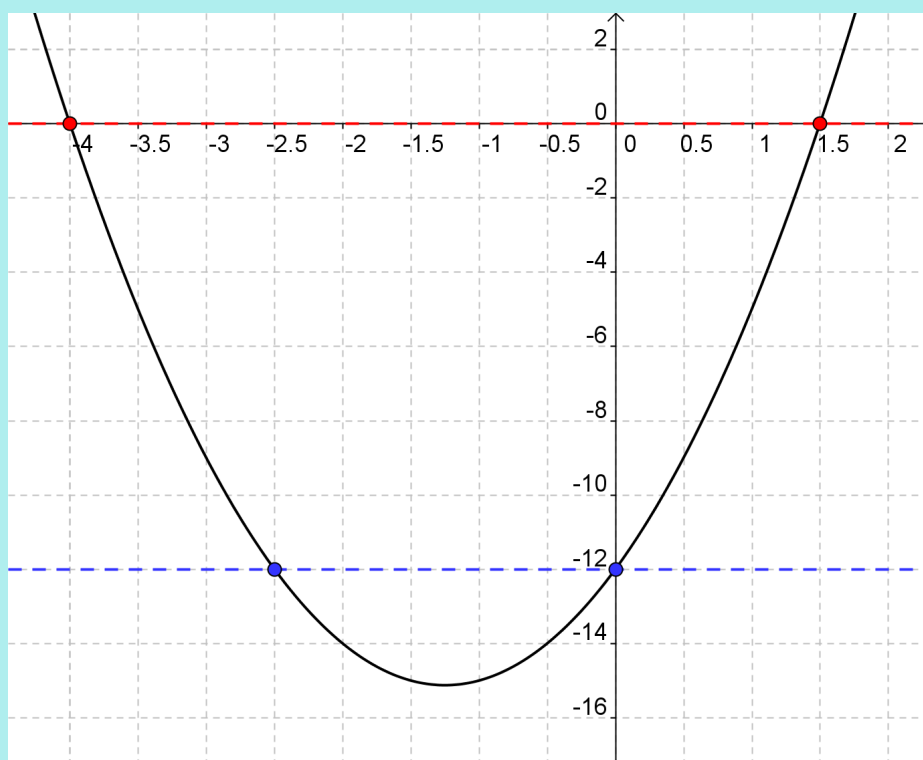
$$0 = x(2x+5)$$

$$x=0 \quad \text{or} \quad 2x+5=0$$

$$\frac{2x}{2} = \frac{-5}{2}$$

$$x = -2.5$$

Ex.2 Solve  $y = 2x^2 + 5x - 12$  for (a)  $y = 0$   
 (b)  $y = -12$



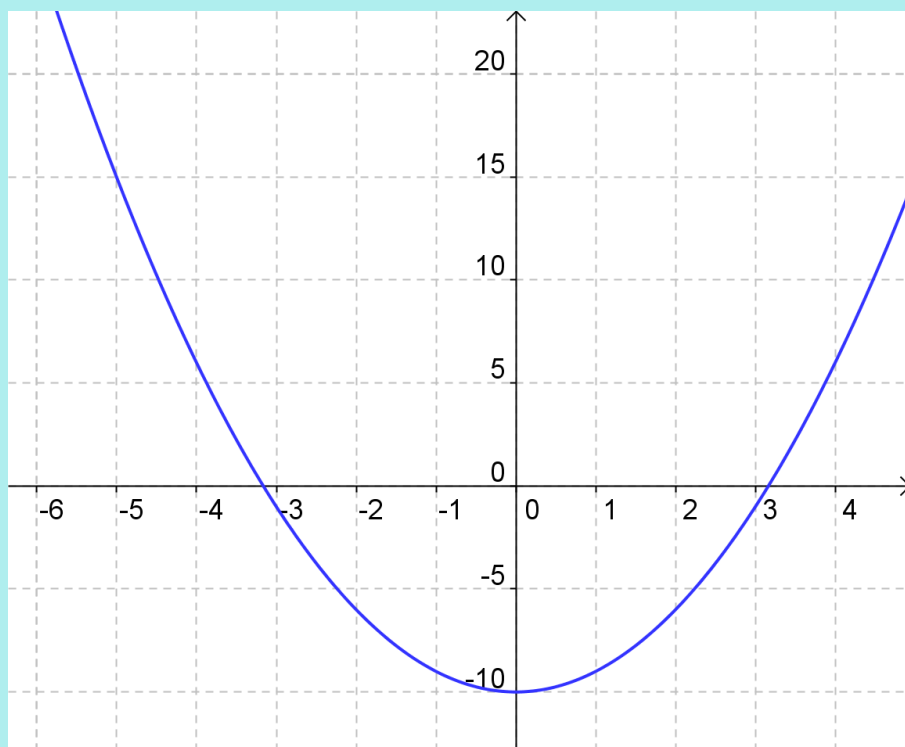
To solve using factored form:

- 1) Expand all terms
- 2) Move all terms to one side of the equal sign so that the equation equals zero
- 3) Factor your expression (if possible)
- 4) Set each factor equal to zero and solve

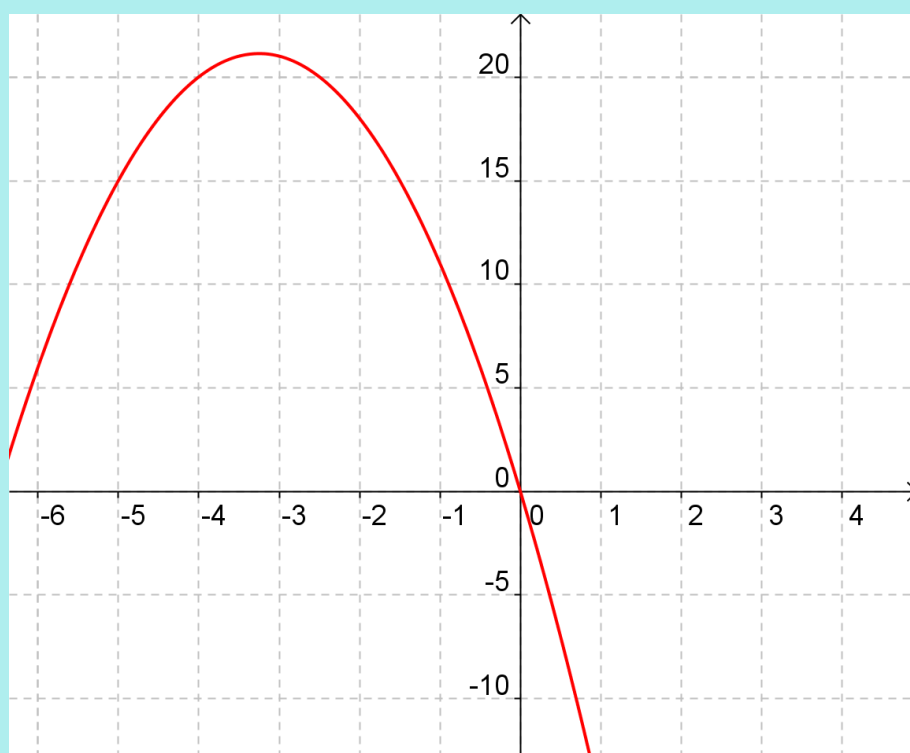
Ex.3 Solve:  $x^2 - 10 = -x(2x + 13)$

$$\begin{aligned}
 & x^2 - 10 = -2x^2 - 13x && \text{Step ①} \\
 & x^2 + 2x^2 + 13x - 10 = 0 && \text{Step ②} \\
 & 3x^2 + 13x - 10 = 0 \\
 & \quad \begin{array}{l} -2 \times 15 = -30 \\ -2 + 15 = 13 \end{array} && \text{Step ③} \\
 & 3x^2 + 15x - 2x - 10 = 0 \\
 & 3x(x+5) - 2(x+5) = 0 \\
 & (3x-2)(x+5) = 0 \\
 & \begin{array}{l} 3x-2=0 \\ \frac{3x}{3} = \frac{2}{3} \\ x = \frac{2}{3} \end{array} \quad \begin{array}{l} x+5=0 \\ x = -5 \end{array}
 \end{aligned}$$

$$y = x^2 - 10 \quad \text{L.S.}$$



$$y = -x(2x + 13) \quad \text{R.S.}$$

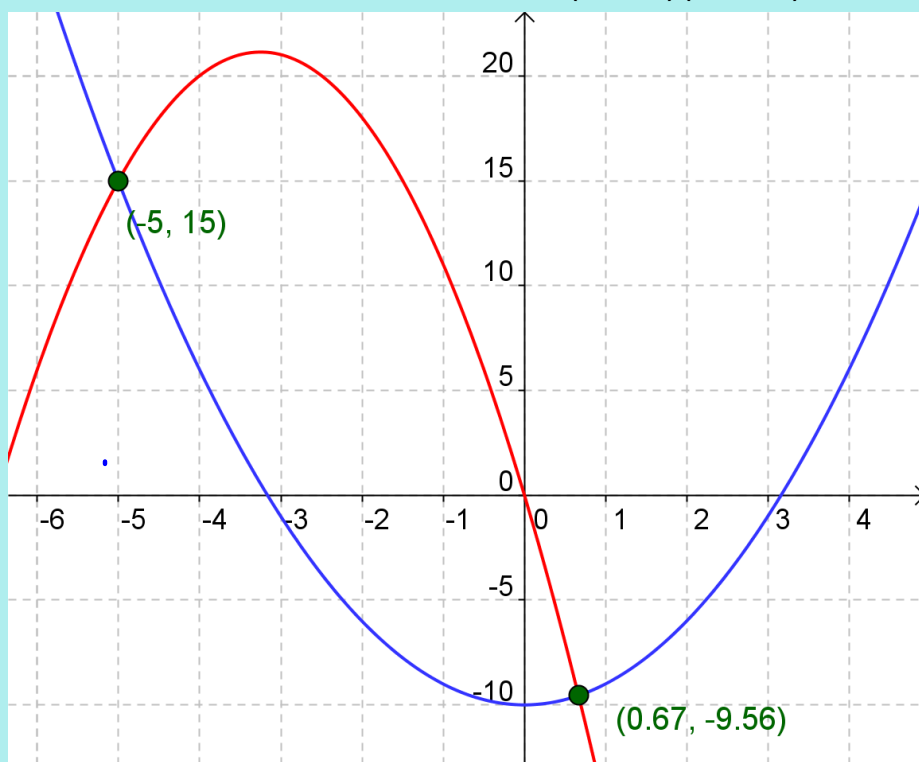


$$x^2 - 10 = -x(2x + 13)$$

which became .....

$$3x^2 + 13x - 10 = 0$$

$$(x + 5)(3x - 2) = 0$$



Assigned Work:

p.320 # 4ac, 6ace, 7ace, 11